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(57) [Abstract]

[Purpose]

Offer the herbicide mixture which has the synergism over weeds.

[Means to Solve the Problems]

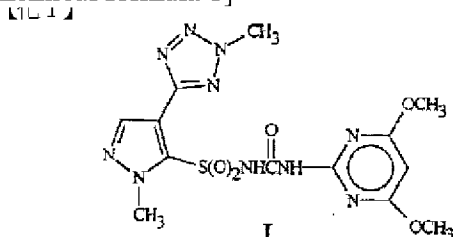
The herbicide mixture in which the present invention contains one sort or the herbicide beyond it chosen from azimsulfuron (azimsulfuron), thenyl chlor (thenylchlor), and pentoxazone (pentoxazone), the herbicide composition of this mixture, And it is related with the activity of this mixture for controlling the vegetation which is not desirable.

[Claims]

[Claim 1]

The compound of the formula I which is N-[[4,6-dimethoxy-2-pyrimidinyl] Amino] Carbonyl]-1-methyl-4-(2-methyl-2H-tetrazole 5-yl)-1H-pyrazole 5-sulfonamide (azimsulfuron (azimsulfuron)) Or a salt suitable for the agriculture,

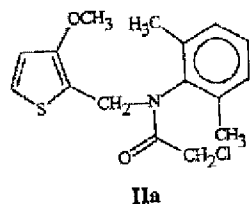
[Chemical formula 1]



And the compound of the formula IIa which is 2-chloro-N-(2,6-dimethylphenyl)-N-[(3-methoxy-2-thienyl) methyl]acetamide (thenyl chlor (thenylchlor))

[Chemical formula 2]

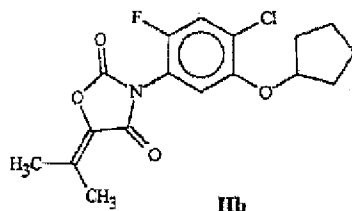
[122]



And 3-[4-chloro-5- (Cyclopentyloxy) The herbicide mixture containing one sort or the compound beyond it chosen from the compound of the formula IIb which is-2-fluorophenyl]-5-(1-methylethylidene)-2,4-oxazolidinedione (pentoxazone (pentoxazone)).

[Chemical formula 3]

[123]



[Claim 2]

A benz chlorofluorocarbon methyl (bensulfuronmethyl), the metsulfuron methyl (metsulfuronmethyl), Propanil (propanil), chlorimuron ethyl (chlorimuronethyl), Pyrazosulfuron ethyl (pyrazosulfuronethyl), A herbicide mixture given in Claim 1 which contains further the compound chosen from the group which consists of imazosulfuron (imazosulfuron), a cinosulfuron (cinosulfuron), and a cyclosulfamuron (cyclosulfamuron).

[Claim 3]

A herbicide mixture given in an effective dose of Claims 1, and the component of at least one sort of next: A composite suitable for the agriculture for controlling growth of the vegetation containing the diluent of a surface active agent, a solid, or a liquid and which is not desirable.

[Claim 4]

The procedure for controlling growth of the vegetation including contacting the herbicide mixture of a statement at the location which it is going to protect at Claim 1 of a weeding-out effective dose and which is not desirable.

[Detailed Description of the Invention]

[0001]

[The field of invention]

The present invention relates to the mixture of the herbicide which has a synergistic effect over weeds.

[0002]

[The background of invention]

When inhibition of the vegetation (vegetation) which is not desirable acquires high crop efficiency, it is dramatically important. Especially achievement of alternative inhibition of

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growth of the weeds in for example, a division rice, a soybean, a sugar beet, maize, a potato, wheat, barley, a tomato, and the useful crop like a plantation crop is dramatically desirable. The weeds growth in such a useful crop which is not controlled causes the considerable decrease in productivity, and brings about the increase in a price [as opposed to consumers by that cause]. Inhibition of the vegetation in a non-crop range which is not desirable is also important. Want of discovering the product which attains such a result is still commercially important.

[0003]

If the combination of a herbicide is used typically, the vegetable inhibition range will be expanded or the inhibition level of the specific kind by the addition effect will increase. It gives a thing with a certain kind of rare surprising combination, larger effect, i.e., synergistic effect, than an addition effect value. Such a valuable combination was discovered this time.

[0004]

Although United States Patent No. 4,746,353, United States Patent No. 4,802,907, and European Patent application disclosure 496,347-A2 are indicating each compound used in the mixture of the present invention Mixtures or those surprising synergistic uses are indicated by neither of these literature.

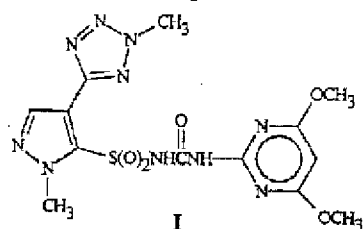
[0005]

[The summary of invention]

It was discovered this time that the present invention controls weeds synergistically. N-[[4,6-dimethoxy-2-pyrimidinyl) Amino] Carbonyl]-1-methyl-4-(2-methyl-2H-tetrazole 5-yl)-1H-pyrazole 5-sulfonamide (and) [azimsulfuron] A salt suitable for Formula I or its agriculture,

[0006]

[Chemical formula 4]

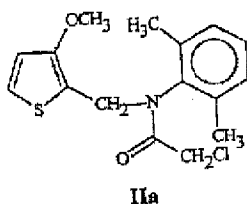


[0007]

2-chloro-N-(2,6-dimethylphenyl)-N-[(3-methoxy-2-thienyl) methyl]acetamide (thenyl chlor (thenylchlor), formula IIa)

[0008]

[Chemical formula 5]



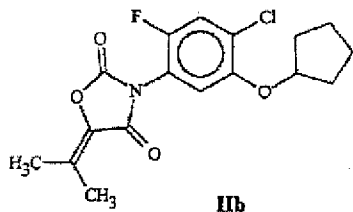
[0009]

And 3-[4-chloro-5-(cyclopentyloxy)-2-fluorophenyl]-5-(1-methylethylidene)-2,4-oxazolidinedione (and) [pentoxazone] It is related with the mixture of the compound beyond one sort or it chosen from Formula IIb.

[0010]

[Chemical formula 6]

[6]



[0011]

The mixture of the above [the present invention] of a weeding-out effective dose again, and the component of at least one sort of next: It is related also with the herbicide composition containing the diluent of a surface active agent, a solid, or a liquid. The present invention relates also to the procedure of controlling the vegetation including applying the above-mentioned mixture of a weeding-out effective dose to the location of the vegetation which is not desirable again and which is not desirable.

[0012]

(a)-type I compound, the compound of Formula IIa, (b)-type I compound, and the compound of Formula IIb are included by the mixture of the present suitable invention for the reinforced weeding-out utilization. a weeding-out effective dose -- this -- a suitable mixture and component [of at least one sort of next]: -- the herbicide composition containing a surface active agent, a solid, or a liquid diluent is also suitable.

[0013]

The suitable procedure of controlling the vegetation which is not desirable includes applying the suitable mixtures or those composites of a weeding-out effective dose to the location of vegetation.

[0014]

Especially suitable application of the mixture of the present invention for the reason of the weeds inhibition range and/or crop selectivity is [paddy field rice] under vegetation among a rice crop.

[0015]

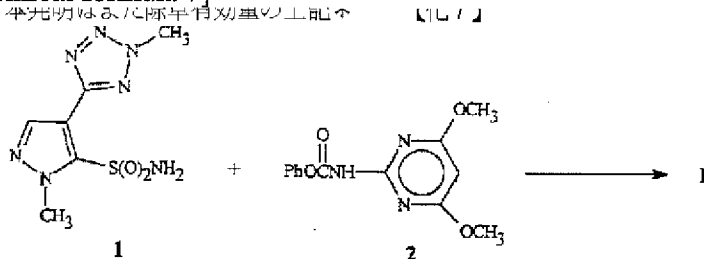
The detail of invention

The compound of Formula I is indicated to United States Patent No. 4,746,353. The synthesis includes the pyrazolesulfonamide of a formula 1, and coupling of the heterocyclic carbamate of a formula 2.

[0016]

Chemical formula 7]

この化合物は、本発明の化合物の代表例である。



[0017]

The mixture of the present invention can contain the sulfonyl urea compound of Formula I as a salt suitable for one sort or its agriculture beyond it. These can be manufactured by many procedures of being known by the technical field concerned. For example, metal salt can be manufactured by contacting the sulfonyl urea of Formula I in the solution of the alkali or alkaline earth metal salt (for example, a hydroxide, alkoxide, carbonate, or hydride) which has sufficient basic anion. A quaternary amine salt can be manufactured with the same technique.

[0018]

The salt of the sulfonyl urea of Formula I can be manufactured also by exchange with a thing different from one cation again. The direct contact with the solution containing the cation which it is going to exchange for the aqueous solution of the salt (for example, an alkali or a quaternary amine salt) of the sulfonyl urea of Formula I can perform cation exchange. The salt containing the exchanged cation for which it asks is insolubility underwater, and this procedure is the most effective when separable [with filtration].

[0019]

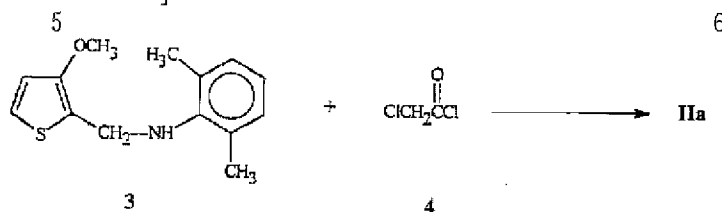
The product which may exchange by letting it pass in the column with which it filled up with cation exchange resin containing the cation which should exchange the aqueous solution of the salt (for example, an alkali or a quaternary amine salt) of the sulfonyl urea of Formula I for the cation of the original salt and for which it asks is eluted from a column. This procedure is useful especially when the salt for which it asks is water solubility (for example, potassium, sodium, or calcium salt).

[0020]

The compound of Formula IIa can be carried out as it is indicated to United States Patent No. 4,802,907, and it can be manufactured. This synthesis includes coupling of aniline of a formula 3, and the acyl chloride of a formula 4.

[0021]

[Chemical formula 8]

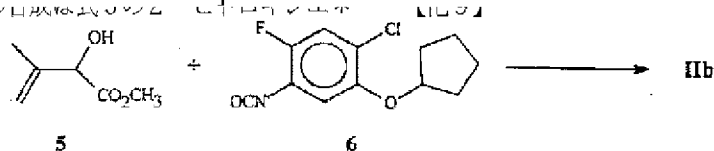


[0022]

The compound of Formula IIb can be carried out as it is indicated to European Patent application disclosure 496,347-A2, and it can be manufactured. The synthesis includes cyclization with 2-hydroxyester of a formula 5, and isocyanate of a formula 6.

[0023]

[Chemical formula 9]



[0024]

Mixing

The mixture of the compound of Formula I and Formulas IIa and IIb can prepare separately the compound of the: (a) type I and Formulas IIa and IIb which can be prepared by many procedures, and can apply it separately. Or it can apply simultaneously as for example, a tank mixture by a suitable bulk density, or the compound of the (b) type I and Formulas IIa and IIb can be prepared together by a suitable bulk density.

[0025]

The mixture of the compound of Formula I and Formulas IIa and IIb It is used in a formulation with a carrier suitable for the agriculture which generally contain the diluent and/or surface active agent of a liquid or a solid, and the formulation is fitted to the type of the physical property of an active ingredient, an application formula, and an environmental element, for example, soil, moisture, and temperature there. The liquid which can make thick by a case and can be made into a gel, for example, a soluble concentrate, (the concentrate which can be emulsified is included), a suspension concentrate, an emulsifiable concentrate (a detailed emulsifiable concentrate and/or a suspension emulsifiable concentrate are included), etc. are included by the useful formulation. The solid which is water-dispersibility ("wettability") or water solubility and is obtained further, for example, dustable powder, (dust), powder (powder), a granule, a pellet, a tablet, a film, etc. are included by the useful formulation. An active ingredient is encapsulated (micro), may be further formed in suspension or a solid formulation, or can also encapsulate the whole formulation of an active ingredient (or "over coating"). The capsulation can control or delay bleedoff of an active ingredient. The formulation which can be atomized can be diluted in a suitable medium, and it can be used with about 1 per ha - the

spraying amount of 100l. of numbers. A high concentration composite is used mainly as another intermediate for formulations.

[0026]

A formulation contains an effective dose of active ingredients, diluents, and surface active agents typically by following outline within the limits which becomes a total of 100% of the weight.

[0027]

	重量%		
	活性成分	希釈剤	表面活性剤
水一分散性および水溶性 顆粒剤、錠剤および散剤	5-90	0-94	1-15
懸濁剤、乳剤、液剤 (濃厚乳剤を含む)	5-50	40-95	0-15
粉剤	1-25	70-99	0-5
顆粒剤および錠剤	0.01-99	5-99.99	0-15
高濃度組成物	90-99	0-10	0-2

A typical solid diluent is Watkins, . It is indicated to et al., Handbook of Insecticide Dust Diluents and Carriers, 2nd Ed., Dorland Books, Caldwell, and New Jersey. It is indicated to Watkins, et al., Handbook of Insecticide Dust Diluents and Carriers, 2nd Ed., Dorland Books, Caldwell, and New Jersey. The typical liquid diluent is indicated to Marsden, Solvents Guide, 2nd Ed., Interscience, New York, and 1950. McCutcheon's Detergents and Emulsifiers Annual, Allured Publ. Corp., Ridgewood, New Jersey, And Sisely and Wood, Encyclopedia of Surface Active Agents, Chemical Publ. Co., Inc., New York, and 1964 show a surface active agent and its recommendation application. All the formulations foam, and in order to reduce cake-izing, an attack, growth of a microorganism, etc., or since it becomes thick and viscosity is increased, they can contain a small amount of additives.

[0028]

In a surface active agent, for example Polyethoxyl-ized alcohols and polyethoxyl-ized alkylphenols Polyethoxyl-ized sorbitan fatty acid esters and dialkyl sulfosuccinic acid Alkyl sulfate, sulfonic acid alkylbenzenes, and organic silicone N,N-dialkyl TAURETO, lignin sulfonate, a naphthalene sulfonate formaldehyde condensate, poly carboxylates, and polyethylene / polyoxypropylene block copolymer are included. Clay, for example, bentonite, montmorillonite, attapulgite and kaolin, starch, sugar, silica, a talc, kieselguhr, urea, calcium carbonate, carbonic acid, sodium hydrogencarbonate, and sodium sulfate are included by the solid diluent, for example. In a liquid diluent, for example Water, N, N dimethylformamide, dimethyl sulfoxide, N-alkyl pyrrolidone, ethylene glycol, polypropylene glycol, A paraffin, alkylbenzenes, alkyl naphthalene, olive oil, Castor oil, the linseed oil, tung oil, sesame oil, corn oil, peanut oil, Cotton seed oil, soybean oil, oleum rapae and coconut oil, fatty acid ester, and ketone For example, cyclohexanone, 2-heptanone, isophorone, 4-hydroxy-4-methyl-2-pentanone and alcohols, for example, methanol, cyclohexanol, decanol, and tetrahydrofurfuryl alcohol are included.

[0029]

The soluble concentrate which includes a thick emulsifiable concentrate can be manufactured by only mixing a component. Sulfonfyl urea salt dispersion liquid suitable for the aqueous sulfonfyl urea or the object for agriculture stabilized chemically is taught to United States Patent No. 4,936,900. The soluble concentrate formulation of the sulfonfyl urea which has the improved chemical stability is taught to United States Patent No. 4,599,412. Dustable powder and powder are blended and can be manufactured by generally grinding like in a hammer mill or a fluid energy mill. A suspension concentrate should be manufactured by wetting-grinding, for example, generally refer to United States Patent No. 3,060,084 for it. atomizing a granule and a pellet to the granular carrier by which the active substance was preformed -- or it can manufacture with an agglomeration technique. Browning, "Agglomeration", Chemical Engineering, December 4, 1967, pp 147-148, Perry's Chemical Engineer's Handbook, 4th Ed., McGraw-Hill, New York, 1963, and eight to 57 or less pages, And refer to WO91/13546. The pellet can be carried out as it is indicated to United States Patent No. 4,172,714, and it can be manufactured. Water-dispersibility and a water-soluble granule can be carried out as they are taught to United States Patent No. 4,144,050, United States Patent No. 3,920,442, and DE No. 3,246,493, and they can be manufactured. The tablet can be carried out as it is taught to United States Patent No. 5,180,587, United States Patent No. 5,232,701, and United States Patent No. 5,208,030, and it can be manufactured. The film can be carried out as it is taught to the British patent No. 2,095,558 and United States Patent No. 3,299,566, and it can be manufactured.

[0030]

About another information about a mixing technique, United States Patent No. 3,235,361, Six columns, 16 lines - seven columns, 19 lines, and the execution example 10-41; United States Patent No. 3,309,192, Five columns, 43 lines - seven columns, 62 lines and the execution examples 8, 12, 15, 39, 41, 52, 53, 58, and 132, 138-140, 162-164, 166 and 167, and 169-182; United States Patent No. 2,891,855, Three columns, 66 lines - five columns, 17 lines and execution example 1-4; Klingman, Weed Control as a Science, John Wiley and Sons, Inc., New York, and 1961, Refer to pp 81-96 and Hanceet al., Weed Control Handbook, 8th Ed., Blackwell Scientific Publications, Oxford, and 1989.

[0031]

In the following execution examples, all percentages are based on weight and all formulations are manufactured by the general procedure.

[0032]

Execution example A

High hardness thickening

Azimsulfuron (azimsulfuron) 1.0%

Thenyl chlor (thenylchlor) 97.5%

Silica aerogel 0.5%

1.0% of synthetic amorphous minute silica

Execution example B

Water-dispersible powder

Azimsulfuron (azimsulfuron) 21.7%

Thenyl chlor (thenylchlor) 43.3%

Dodecylphenol polyethylene glycol ether 2.0%
Sodium ligninsulfonate 4.0%
6.0% of SHIRIKO sodium aluminate
Montmorillonite (what was calcined) 23.0%

Execution example C

Granule

Azimsulfuron (azimsulfuron) 1.7%
Thenyl chlor (thenylchlor) 8.3%
90.0% of an attapulgite granule (low volatility body, 0.71/0.30mm, and U.S.S.No.25-50 sieve)

Execution example D

The pellet by which extrusion molding was carried out

Azimsulfuron (azimsulfuron) 0.6%
Thenyl chlor (thenylchlor) 24.4%
10.0% of anhydrous sodium sulfate
Crude calcium ligninsulfonate 5.0%
1.0% of alkyl sodium naphthalenesulfonate
Calcium / magnesium bentonite 59.0%

Execution example E

High hardness thickening

Azimsulfuron (azimsulfuron) 0.7%
Pentoxazone (pentoxazone) 97.8%
Silica aerogel 0.5%
1.0% of synthetic amorphous minute silica

Execution example F

Water-dispersible powder

Azimsulfuron (azimsulfuron) 21.7%
Pentoxazone (pentoxazone) 43.3%
Dodecylphenol polyethylene glycol ether 2.0%
Sodium ligninsulfonate 4.0%
6.0% of SHIRIKO sodium aluminate
Montmorillonite (it calcined) 23.0%

Execution example G

Granule

Azimsulfuron (azimsulfuron) 0.9%
Pentoxazone (pentoxazone) 9.1%
90.0% of an attapulgite granule (low volatility body, 0.71/0.30mm, and U.S.S.No.25-50 sieve)

Execution example H

The pushing lock by which extrusion molding was carried out

Azimsulfuron (azimsulfuron) 0.5%
Pentoxazone (pentoxazone) 24.5%

10.0% of anhydrous sodium sulfate
 Crude calcium ligninsulfonate 5.0%
 1.0% of alkyl sodium naphthalenesulfonate
 Calcium / magnesium bentonite 59.0%

Execution example I

High hardness thickening

Azimsulfuron (azimsulfuron) 6.2%
 Thenyl chlor (thenylchlor) 36.9%
 Pentoxazone (pentaxazone) 55.4%
 Silica aerogel 0.5%
 1.0% of synthetic amorphous minute silica

Application

While the mixture of the weeding-out nature compound of Formula I and Formulas IIa and IIb held the alternative safety to the first grader monocotyledonous plant kind of a certain kind like a rice, for example, giving the synergistic inhibition which selected weeds do not expect was discovered this time. Although the mixture of the present invention almost or completely does not have effect on the japonica (japonica) or the Indica (indica) rice transplanted or directly seed(ed) It is effective in controlling selectively growth of the weeds seed of the terrestrial or water grass (grass) which is not desirable, broad leaf vegetation, and the department vegetation (sedge) of sedge. Since both barnyard grass and a rice are grasses, the synergistic action which these give inhibition of barnyard grass (barnyardgrass) without the damage over a rice is dramatically worthy, and it should take notice of it. applying the mixture of the present invention to the dry soil or irrigation water soil over which the weeds kind spreads -- or the application to the leaf of weeds vegetation -- or the advantage in which weeds become extinct, or suffer sufficient damage, and competition is not lost to a rice crop by application in the water which covers a leaf, a seed, or a vegetable part is given. Application to the directly seed rice from before germination to 4 leaf phases, application to the transplantation rice in a 1.0-4.0 leaf phase, and the application to the weeds from before germination to 3 leaf phases are desirable. Application can be performed to intermittent or continuous irrigation type rice vegetation.

[0033]

The weeding-out effective dose of the compound of Formula I (azimsulfuron (azimsulfuron)) and Formula IIa (thenyl chlor (thenylchlor)) will be changed depending on an amount, a type, etc. of an environmental condition, mixing, the application procedure, and the existing vegetation. The using rate ratios of the I pairs of formula type IIa are generally 1:2-1:100, and their ratio of 1:5-1:40 is desirable for almost all applications. Generally, the compound of Formula I is applied at a rate of 3 - 30 gai/ha, and the compound of Formula IIa is applied at a rate of 50 - 300 gai/ha. Suitably, the compound of Formula I is applied at a rate of 5 - 20 gai/ha, and the compound of Formula IIa is applied at a rate of 75 - 250 gai/ha.

[0034]

The weeding-out effective dose of the compound of Formula I (azimsulfuron (azimsulfuron)) and Formula IIb (pentoxazone (pentaxazone)) will be changed depending on an amount, a type, etc. of an environmental condition, mixing, the application procedure, and the existing vegetation.

The using rate ratios of the I pairs of formula type IIb are generally 1:2-1:150, and their ratio of 1:10-1:50 is desirable for almost all applications. Generally, the compound of Formula I is applied at a rate of 3 - 30 gai/ha, and the compound of Formula IIb is applied at a rate of 50 - 500 gai/ha. Suitably, the compound of Formula I is applied at a rate of 5 - 20 gai/ha, and the compound of Formula IIb is applied at a rate of 75 - 400 gai/ha.

[0035]

The expert in the technical field concerned can decide a required tide easily about the weeds inhibition considered as the ratio of the herbicide of a herbicide versus the types IIa and IIb of an application rate and Formula I, and a request, and a crop safety level.

[0036]

For the practical activity as herbicide treatment, the mixture of the present invention is further mixed with other known herbicides and the crop protection chemicals for agriculture, and you may make it give the additional activity range to another weeds kind.:cyhalofop- butyl which is not limited to them although the following are included by the herbicide which can be mixed (cyhalofop-butyl), Cafenstrole (cafenstrole), dimepiperate (dimepiperate), EPO pro out (epoprodan), etobenzanid (etobenzanid), Pretilachlor (pretilachlor), thiobencarb (thiobencarb), Pyributicarb (pyributicarb), pyrazolate (pyrazolate), benxofenap(benxofenap), bromobutide (bromobutid), mefenacet (mefenacet), anilofos (anilofos), and benfuresate (benfuresate). The bensulfuron methyl (bensulfuronmethyl) whose herbicide mixture partner used suitably is a sulfonyl urea herbicide, Metsulfuron methyl (metsulfuronmethyl), chlorimuron ethyl (chlorimuronethyl), They are pyrazosulfuron ethyl (pyrazosulfuronethyl), imazosulfuron (imazosulfuron), a cinosulfuron (cinosulfuron), and a cyclosulfamuron (cyclosulfamuron).

[0037]

Furthermore, you may improve performance for the mixture of the present invention combining an additive permissible in agriculture, for example, a surface active agent, palliative, a spread agent, an emulsifier, or a fertilizer. The mixture of the present invention will generally be used as a prepared composite.

[0038] The following check shows the depressor effect of the compound of the present invention to specific weeds. However, the weeds inhibition obtained with these compounds is not limited to these kinds. In these checks, a compound 1 is the azimsulfuron (azimsulfuron) which is a compound of Formula I. A compound 2 is thenyl chlor (thenylchlor) which is a compound of Formula IIa, and a compound 3 is the pentoxazone (pentoxazone) which is a compound of Formula IIb.

[0039]

The biological execution example of the present invention

Check A formula

The seed was scattered in each container of barnyard grass (*Echinochloa crus-galli*), and it was made to grow up to 2 leaf phases of a development. The Tama silt loam soil (Tamasiltloamsoil) was used for propagation. Preliminary germination of the rice (*Oryza sativa*, cv.Cypress) was carried out, the seed was scattered on the surface of the soil, and it was made to grow up to 3 leaf phases of a development. The depth of the water in all the containers was adjusted to about 3cm before treatment. Compounds 1 and 2 were prepared in the un--phytotoxicity solvent mixture,

and it applied to the surface of the soil in each container.

[0040]

The vegetation and undisposed control with which it dealt were maintained for 14 days under greenhouse conditions, and vegetation was visually evaluated at the event [undisposed control]. The vegetable answer assessment summarized in Table A is due to the scale of 0-100, 0 has no effect and 100 is full inhibition there.

[0041]

The addition weeding effects the mixture of a compound 1 and a compound 2 is predicted to be using the Colby (Colby) type were calculated. Colby type (Colby, S. R. "Calculating-Synergistic and Antagonistic Responses of Herbicide Combinations," Weeds, 15(1),) The addition effect that a herbicide mixture is predicted by pp20-22-(1967) is calculated. And it is related with two sorts of active ingredients, and is a formula: $P_{a+b} = P_a + P_b - (P_a P_b / 100)$ [P_{a+b} is an operative percentage of the mixture predicted from addition contribution of each component. P_a -- a mixture -- inside -- concurrent use -- a rate -- it can set -- the -- one -- an active ingredient -- observing -- having had -- operative -- a percentage -- it is -- and -- P_b -- a mixture -- inside -- concurrent use -- a rate -- it can set -- dibasic -- an active ingredient -- observing -- having had -- operative -- a percentage -- it is --] -- calculating -- having .

[0042]

Giving inhibition of weeds [better than what is predicted by the calculation from the Colby type] of a certain kind to a surprising thing is found out, therefore the combination of a compound 1 and a compound 2 shows a synergistic action. Table A shows the addition effect (Colby type) that visual assessment of inhibition of the specific weeds at the time of applying as a mixture of two sorts of active ingredients, a compound 1 and a compound 2, a compound 1, and the herbicide mixture of a compound 2 are predicted, when a compound 1 and a compound 2 are independently applied as a single active ingredient. The various ratio and various mixing types of the 1 pair of compound compound 2 give useful weeds inhibition with the combination of two sorts of herbicides.

[0043]

[Table 1]

化合物 1	化合物 2	イネ		イヌビエ	
		観 察	予測1	観 察	予測
単 独					
5	0	0	—	30	—
10	0	10	—	70	—
0	90	0	—	70	—
0	180	40	—	98	—
混合物					
5	90	30	0	85	79
10	90	10	10	98	91
5	180	40	40	99	99
10	180	40	46	100	99

[0044]

The combination of thenyl chlor (thenylchlor) (compound 2) of azimsulfuron (azimsulfuron) (compound 1) and 90 g/ha was wonderfully increased from the thing which had barnyard grass inhibition predicted so that this check might show. In 5g thenyl chlor [azimsulfuron +90g], inhibition increased from the defect (79%) at fitness (85%). In 10g thenyl chlor [azimsulfuron +90g], inhibition became 98% (excellent) from 91% (good) of predicted value. Since inhibition was already excellent (98%) at a higher rate (180 g/ha) of thenyl chlor, there was no opportunity to show a synergistic action at this high rate by this check. According to this synergistic action, the mixture of the present invention can be used at a low application rate based on operative addition of each component which uses the Colby type more nearly substantially than a required thing. Since the increase in damage has not occurred in the rate high rather than 10g azimsulfuron, or the higher rate of thenyl chlor, the increase in the rice damage seen at a low rate called 5g thenyl chlor [azimsulfuron +90g] is clearly unusual. The rice in this check directly seed(ed) by water is more sensitive to the damage caused by a herbicide than to the transplantation rice which is the more general carrying-out method for agriculture. Furthermore, the direction of the rice at the time of making it grow up in a greenhouse is far weaker than the outdoors, and it is more sensitive to the damage caused by a herbicide. These greenhouse results followed and have suggested almost or that there is no damage of a crop under field conditions at a high rate about the azimsulfuron of 10 g/ha, and thenyl chlor of 180 g/ha.

[0045]

Check B formula

The seed was scattered in each container of barnyard grass (*Echinochloa crus-galli*), and it was made to grow up to 2 leaf phases of a development. The Tama silt loam soil was used for propagation. Preliminary germination of the rice (*Oryza sativa*, cv. Cypress) was carried out, the seed was scattered on the surface of the soil, and it was made to grow up to 3 leaf phases of a development. The depth of the water in all the containers was adjusted to about 3cm before treatment. Compounds 1 and 3 were prepared in the un-phytotoxicity solvent mixture, and it applied on the surface of the soil in each container.

[0046]

The vegetation and undisposed control with which it dealt were maintained for 14 days under greenhouse conditions, and vegetation was then evaluated visually [undisposed control]. The vegetable answer assessment summarized in Table B is due to the scale of 0-100, 0 has no effect and 100 is full inhibition there.

[0047]

Giving inhibition of weeds [better than what is predicted by the calculation from the Colby type] of a certain kind to a surprising thing is found out, therefore the combination of a compound 1 and a compound 3 shows a synergistic action. Table B shows the addition effect (Colby type) that visual assessment of inhibition of the specific weeds at the time of applying as a mixture of two sorts of active ingredients, a compound 1 and a compound 3, a compound 1, and the herbicide mixture of a compound 3 are predicted, when a compound 1 and a compound 3 are independently applied as a single active ingredient. The various ratio and various mixing types of the 1 pair of compound compound 3 give useful weeds inhibition with the combination of two sorts of herbicides.

[0048]

[Table 2]

化合物 1	化合物 3	イネ(直撒き)		イヌビエ	
		観 察	予測†	観 察	予測
単 独					
5	0	0	—	30	—
10	0	0	—	70	—
0	75	0	—	60	—
0	150	0	—	90	—
混合物					
5	75	0	0	95	72
10	75	0	0	95	88
5	150	0	0	90	93
10	150	0	0	98	97

[0049]

So that this check may show 90% or less of inhibition of barnyard grass It was found out by the thing with surprising the combination of pentoxazone (pentoxazone) (compound 3) of azimsulfuron (azimsulfuron) (compound 1) predicted to probably give and 75 g/ha giving a far good effect. For example, 95% was observed although it was predicted that the azimsulfuron of 5g / ha and the pentoxazone of 75g / ha probably did only 72% of damage to barnyard grass. This is a difference between an optimum and the inhibition level below the optimal. According to this synergistic action, the mixture of the present invention can be used at a low application rate based on operative addition of each component which uses the Colby type more nearly substantially than a required thing. Damage was not observed by the directly seed(ed) rice in

contrast with the synergistic action over barnyard grass.

[0050]

Check C formula

The transplantation rice (*Oryzasativa*, cv.Cypress) was grown up to 5 leaf phases before treatment in the Tama silt loam soil. Barnyard grass (*Echinochloacrus-galli*) was 2 leaf phases. Chemicals were prepared and it added to the paddy field directly. The container has been repeatedly arranged on a greenhouse bench by random setting out thoroughly 3 times. While experimenting in the depth of water, it kept at 3cm all the time. 14 days after treatment, the damage level of a rice and inhibition of barnyard grass were measured by visual assessment. The vegetable answer assessment summarized in Table C is due to the scale of 0-100, 0 has no effect and 100 is full inhibition there. The addition weeding effects the mixture of a compound 1 and a compound 3 is predicted to be using the Colby type were calculated.

[0051]

[Table 3]

化合物 1	化合物 3	イネ(移植)		イヌビエ	
		観 察	予測†	観 察	予測
単 独					
5	0	0	—	37	—
10	0	0	—	73	—
15	0	0	—	88	—
0	50	0	—	0	—
0	100	0	—	33	—
0	150	0	—	40	—
混合物					
5	50	0	0	57	37
5	100	0	0	65	58
5	150	0	0	67	62
10	50	0	0	84	73
10	100	0	0	96	82
10	150	0	0	95	84
15	50	0	0	94	88
15	100	3	0	99	92

[0052]

The combination of azimsulfuron (azimsulfuron) (compound 1) and pentoxazone (pentoxazone) (compound 3) gave good barnyard grass depressor effect more nearly substantially than the inhibition value predicted in all the examined rates so that this check might show. When the predicted effect is relatively low, a synergistic action can give the greatest operative increase. In this check, the azimsulfuron of 5 g/ha and the pentoxazone of 50 g/ha gave 57% of inhibition to 37% of predicted value. The predicted effect already at the nearly 100 times Although the observed effect could not be farther [than it] large, in this check, the significant increase of

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inhibition of 99% [from] of 92% predicted value was produced also in the synergistic action from the azimsulfuron of 15 g/ha, and the pentoxazone of 100 g/ha. According to this synergistic action, the mixture of azimsulfuron and pentoxazone gives good inhibition for useful purpose from a predicted value in a lower application rate. Damage was not substantially observed by the transplantation rice by contrast as the synergistic action over barnyard grass.

[0053]

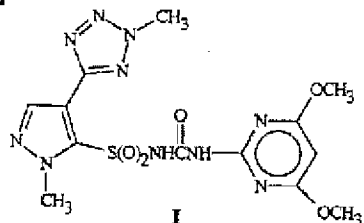
The main descriptions and modes of the present invention are as follows.

[0054]

1. N-[[The compound of the formula I which is amino] carbonyl]-1-methyl-4-(2-methyl-2H-tetrazole 5-yl)-1H-pyrazole 5-sulfonamide (azimsulfuron (azimsulfuron)) (4,6-dimethoxy- 2-pyrimidinyl) Or a salt suitable for the agriculture,

[0055]

[Chemical formula 10]
[10]

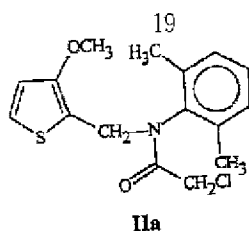


[0056]

And the compound of the formula IIa which is 2-chloro-N-(2,6-dimethylphenyl)-N-[(3-methoxy-2-thienyl) methyl]acetamide (thenyl chlor (thenylchlor))

[0057]

[Chemical formula 11]



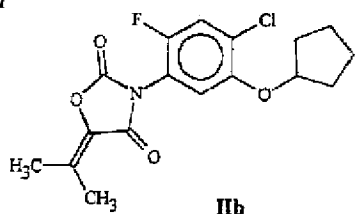
[0058]

And 3-[4-chloro-5- (Cyclopentyloxy) One sort or the compound beyond it chosen from the compound of the formula IIb which is-2-fluorophenyl]-5-(1-methylethylidene)-2,4-oxazolidinedione (pentoxazone (pentoxazone)) is included.

[0059]

[Chemical formula 12]

化121



[0060]

Herbicide mixture.

[0061]

2. Herbicide mixture of the above 1 containing compound of Formula I, and compound of Formula IIa.

[0062]

3. Herbicide mixture of the above 1 containing compound of Formula I, and compound of Formula IIb.

[0063]

4. benz Chlorofluorocarbon Methyl (Bensulfuronmethyl), Metsulfuron methyl (metsulfuronmethyl), propanil (propanil), Chlorimuron ethyl (chlorimuronethyl), pyrazosulfuron ethyl (pyrazosulfuronethyl), One herbicide mixture of the above 1, 2, or 3 which contains further the compound chosen from the group which consists of imazosulfuron (imazosulfuron), a cinosulfuron (cinosulfuron), and a cyclosulfamuron (cyclosulfamuron).

[0064]

5. One herbicide mixture of an effective dose of above 1, 2, or 3, and the component of at least one sort of next: composite suitable for agriculture for controlling growth of vegetation (vegetation) containing diluent of surface active agent, solid, or liquid and which is not desirable.

[0065]

6. Procedure for controlling growth of vegetation including contacting one herbicide mixture of the above 1, 2, or 3 of weeding-out effective dose at location which it is going to protect and which is not desirable.

[0066]

7. Procedure of the above 6 that location which it is going to protect is rice crop.

[0067]

8. Procedure of the above 7 which grows in paddy field (floodedpaddy) which rice crop irrigate(ed).